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A Critical Analysis About the External Influence on Artyabhatiyam

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Introduction: Next to the extant Indian astronomical works of Vedanga Jyotisha (c.1400 BCE) and Surya Siddhanta (c.4th cent. CE), Aryabhatiyam occupies an important place in the history of Indian astronomy. Again, next to Vedas, perhaps, more Bhashyas / commentaries are available to Aryabhatiyam. However, scholars of western origin have invariably tried to find non-Indian influence on Aryabhatiyam and of Indian origin too appear to have accepted the view. Placing Aryabhatiyam after Surya Siddhanta, they have discovered Greek, Babylonian and other influence on it.

Alphabetic System of Expressing Numbers etc: Aryabhata uses Sanskrit alphabets to denote numbers and they are used figuratively in his aphorisms conveying many astronomical and mathematical concepts. In fact, it has been inherent to the Sanskrit literature and such method is traced back to Vedic period. However, western scholars have been consistently propagating that Aryabhata might have borrowed such methodology from the Greeks. Fleet[1] was the first to point out such alleged Greek influence on Aryabhatiyam. He concluded arbitrarily.

> "***Knowing the Greek source of the greater part of the astronomy etc., which we have in the Aryabhatiya and subsequent works, we naturally think of the possibility of a similar origin for this system of numeration***."

Here, the attempt is to suggest the possibility, instead of giving a proof, because of the pre-condition that Aryabhata knew the Greek source of the greater part of the astronomy etc. G.R. Kaye elaborated it[2], but, Sarada Kanta Ganguly[3] refuted it taking point by point the arguments put forward by Kaye. G.R. Kaye's attempt appears to be more to prove that Aryabhata was indebted to others than Mohammed ibn Musa (820 CE) to Aryabhata[4]. He himself points out that Leon Rodet appears to have believed that Aryabhata owed at least some of his mathematics to a Greek source, although he explicitly defers the consideration of this troublesome question[5].

The Indian tradition is replete with evidences about the representation of alphabets for numerals and the idea of using alphabet to denote numbers is traced back to Panini (c.700 BCE) who used the vowels of the Sanskrit alphabet to denote numbers. The usage of such system was restricted to the scholars[6]. The Katapayadi and Aksarapalli systems were used in different parts with variations. And therefore, to imply or assert that Aryabhata copied it from the Greeks is not sustainable.

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Hsine Tables: Aryabhatta gave a table of 24 Hsines in a quadrant, which has been attributed to him by Lalla. The same is given in Surya Siddhanta also. About Surya Siddhanta, the western scholars have been of the opinion that it was introduced into India from Babylon. Therefore, because of the similarity, they hasten to assert that Aryabhata obtained the table from them.

About the Sine tables, Kaye asserted that the historical order of the development of them was Hipparchus (c.130 CE). Ptolemy (c.150 CE), Paulisa of Alexandria (c.378 CE), Pulisa (c.400 CE), and very probably Aryabhata obtained his results from Pulisa[7]. Thus, their attempts to prove Aryabhata as a borrower rather than an original astronomer smacks evidence.

Rotation of Earth on Its Own axis: Aryabhata was the first to discover and record that earth revolves around its own axis (Gola 9-10):

> 9. Just as a man in a boat moving forward sees the stationary objects (on either side of the river) as moving backward, just so are the stationery stars seen by people at Lanka (on the equator), as moving exactly towards the west.
>
> 10. (It so appears as if the entire structure of the asterisms together with the planets were moving exactly towards the west of Lanka, being constantly driven by the protector wind, to cause their rising and setting (K.S. Shukla's translation is used).

Here, Aryabhata succinctly points out the rotation of earth on its own axis. It may be noted that Ptolemy, the Greek astronomer, from whom Aryabhata was allegedly derived knowledge held that earth was stationary[8]. It is a wonder that borrower to have more scientific knowledge than the lender!.

Zodiac and Naming of Days: In Kalakriya, Aryabhata mentions about the signs of Zodiac and Lords of days or hours (14-17):

> 14. The signs of the Zodiac are smaller in smaller orbits, the degrees and minutes also vary in size in the same proportion being the same parts of respective orbits.
>
> 15. Beneath the stars are the planets in the order, Saturn, Jupiter, Mars, the Sun, Venus, Mercury and the Moon; beneath all these is the earth stationed at the centre of space like a tying post for all.
>
> 16. These seven beginning with Saturn are in their (Increasing) order of quickness and are the lords of the hours; the fourths in order of quickness are the successive lords of the days beginning with the sunrise (translation of KS. Shukla is used).

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Thus, the lords of 24 hours are: Saturn, Jupiter, Sun, Venus, Mercury, Moon, Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon, Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon, Saturn, Jupiter and Mars and The lords of days are: Saturn, Sun, Moon, Mercury, Jupiter, and Venus.

All are reckoned from sunrise at Lanka.

The naming of days after the seven planets by Aryabhata was opposed by Varahamihira (Panca Siddhantika, XV 26-29) and Brahmagupta (Brahma Sphuta Siddhanta, XI. 12-13). As Surya Siddhanta explains the meaning of the day in the same way as Aryabhata (Surya Siddhanta, XII.78-79), western scholars ascribe that Aryabhata derived his knowledge from Babylon[9].

How Aryabhata Got Such Knowledge?: Aryabhata could not have written such a work of aphorism with all existed astronomical and mathematical concepts, theories and laws all of sudden. This clearly proves the existence of such knowledge earlier. Dr Thibaut[10] too points out:

> "Aryabhata may have been the first or one of the first, to expound the principles of that system in a highly condensed and technical form, and he may have improved the general theory in details: ***but the main body of doctrine existed before him: he did not create it but merely recast it in a different form……..*** That he was original, at least as far as India is concerned in maintaining the daily rotation of the earth on its axis, nobody of course has ever denied"

Then, he says that there is no evidence for Aryabhata having been acquainted with Greek views.

Surprisingly, Indian traditional astronomers themselves accused Aryabhata for deviating away from the traditional system as indicated out by Al-Beruni. Brahmagupta was highly critical about him. He vilified that Aryabhata's teachings about eclipses was not in accordance with the Vedas, Smritis composed by Manu and Samhita by Garga and he stood outside of generally acknowledged dogma that was not allowed[11]. Suryadeva of 16th century pointed out that he acquired the astronomical knowledge through supernatural agencies. H. Kern[12] also pointed out about this aspect.

> "***Divine favour dawned upon him; he was inspired: he gave utterance to at spontaneous outburst of astronomical knowledge, clothed in a poetical language.....These facts lead the learned to believe that the ten verses were inspired and could not be attributed to human authorship***".

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Therefore, it is evident that just to hide the origin of Aryabhata and Aryabhatyam, the later-day scholars must have resorted to mudslinging. As pointed out Aryabhata name implies that he must have hailed from low caste and therefore, the Brahmins must have been jealous about his knowledge par excellence. From the available evidences, it is learned clearly that he must have hailed from south India. That is why the critic Brahmagupta himself had to follow his own (Aryabhata's) method. But, Aryabhata has followed only the traditional method with exception of taking the traditional knowledge from the sacrificial pits to heavens, which perhaps was resented by the orthodoxy.

Internal Evidences Show that Aryabhata Belonged to South India: Aryabhata compares earth with the Kadamba flowers (Kadamba pushpa Gola.7). Kadamba flowers have been described succinctly in Sangam literature: globular flowers (Paditruppattu. Patigam 4:7) the wheels (of chariot like Kadamba flowers (Paripadal 5:51; 21:10-11): They are found mostly in Southern India. They have unique meaning of spirituality, with freligious, ayurvedic and astronomical significance. Another aspect is the Kaliyuga or Kali era followed in the South as proven by the literary and archaeological evidences.

Aryabhata and Kaliyuga: Aryabhata repeatedly mentioned about Kaliyuga:

In a yuga, the eastward revolutions of Sun are 43,20,000.....(Gitika.3).

The difference between the revolution-numbers of any two planets is the number of conjunction of those planets in a yuga. The revolutions of the sun and the moon added up and doubled represent the number of their Vyatipada yugas of these planets (Kalakriya.3).

Here, it is pointed out that the concept of Vyatipada is as old as that of Vedanga-Jyotisa c. 1400 BCE). This proves that Aryabhata has compiled the age-old existing system of astronomy with newly found data, corrections and problems.

In Kalakriya aphorisms, he repeatedly mentions about Yuga, which has to be interpreted as Kaliyuga in the context as supported by other internal evidences.

Aryabhata and Bharata: Aryabhata specifically mentions about Bharata. "kalpadher yugapadna ga ca guru divasacca, bharatat purvam (1.5), meaning "Since Thursday. the beginning of the current Kalpa, 6 Manus, 27 Yugas and 3 quarter yugas had elapsed before the Bharata or beginning of the Kaliyuga.

Thus, one Kalpa = 14 Manus
one Manu = 72 Mahayugas

Here, the expression ***bharatat purvam*** can be taken as before the Bharat war, as other meanings do not convey or fit in proper meaning. Therefore, he was definitely, a person conscious of tradition and an epoch starting with Mahabharat war.

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Aryabhata and Lanka: Aryabhata has been evidently giving much importance to Lanka than any other city in his astronomically significant sutras:

After giving number of revolutions of planets, he says, "These revolutions commenced at the beginning of the sign Mesha/ Aries on Wednesday at sunrise at Lanka (when it was the commencement of the current Kalpa /yuga) (Gitka.4).

Aryabhata mentions four cities Lanka, Yavakoti, Siddhapura and Romaka situated at equal distance from Maru at 90° at niraksha ie, 0° latitude implying equator.

> "Just as a man going east by a boat sees a stationary thing as if it is going west, so do the fixed stars appear to be going straight westward at Lanka" (IV.9).
>
> "The frame of constellation with all the planets daily move straight westward at Lanka being thrown that way by the wind called Prabhava for producing their daily risings and settings" (V.10).
>
> "What is sunrise at Lanka is sunset at Siddhapura, is noon at Yavakati and is midnight at Romaka" (IV.13).
>
> "Lanka is midway between the land and water hemispheres, is at one-fourth of the circumference of the earth (from the pole) and Ujjain is at one-fourth of that quadrant straight towards the north (IV.14). (All translations are from P.C. Sengupta).

Here, much importance given to Lanka by Aryabhata is to be noted. Aryabhata or the author of the work attributed to Aryabhata could have mentioned these details, had he not been there to observe the exact position. When Lanka was so important for the astronomical purposes and how it was connected with other astronomical places are also to be analyzed critically. From IV.13, it is evident that Lanka and Siddhapura are situated exactly to each other on the globe and so also Yavakoti and Romaka, and all the four cities on the equator distances from the Meru. These concepts are found in Surya Siddhanta (1.53, 11.43, XII.37-41, 52, 70, 71 and XIII.14).

Particularly, ***the verses XII.37-41 of Surya Siddhanta*** are repeatedly appearing in the works of Aryabhata, Bhaskara and others. They are quoted just like some laws. Therefore, the 4th century to 12th century astronomers definitely knew that the cities as mentioned were not exactly situated as mentioned by the authors of Surya Siddhanta or later by Aryabhatiya.

Therefore, at the time of the writers of Surya Siddhanta and Original Aryabhatiyam, the cities have been situated on the equator at equal distances at 90^0 from the Mount Meru. After that because of the changes in the landmass, due to plate tectonic processes and

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sea level rises, the Lanka of that period must have disappeared. That is why modern, commentators dub them as imaginary cities situated on the equator (P.C. Sengupta etc). Had they been imaginary cities, the observations made and the astronomical calculations given would not tally.

Otherwise, the possibility is when Aryabhata observed exactly as he stated in his verses, that he should have existed at the time when those cities existed exactly at 90° and equal distance from each other. Though, scholars differ in identifying the three cities Yavakoti, Romaka and Siddhapura, they agree with the identification of Lanka with two options, one group of scholars identifying with the present Sri Lanka and the other group with that of Lanka situated on the niraksha 0° latitude i.e. equator.

Here, the identification of Ramayan Lanka with that of astronomical Lanka is significant to be noted for verification, as to whether both are one and the same or the astronomical Lanka is just an imaginary place marked on the globe for calculation of time and distances. Incidentally, based on the planetary position at the time of birth of Rama and other descriptions provided in the Valmiki Ramayana, the date of Rama has been fixed as 4433 BCE [13]. In Mahabharat, there is a verse, which says that Hastinapura, Avanti, Kanyakumari and Lanka were all on the same longitude. But, they were not like that even 2000 years back, when the present Sri Lanka (Ceylon) got separated from India. Therefore, the Ramayan Lanka must have been different from the present Sri Lanka and it is rightly located on the equator.

Robert Sewell[14] notes that Lanka is not Ceylon, but a place supposed to be on the equator, or at 0°0'0" on the meridian of Ujjain, or longitude 95° 48'.

John Playfair[15] records, that –

> "…..from a Hindoo map, in the Ayeen Akbery, vol. iii, p.25. Lanka appears to be an island which marks the intersection of Cape Comorin, with the equator and is probably one of the Maldivy islands. See also a note in the Ayeen Alkbery, ibid, p.36".

Therefore, if the astronomer made such observations during a particular time and records in his work, it is evident that he must have existed during the period. Accordingly, the Aryabhata tradition of astronomy must have originated between 4433 BCE and 2000 BCE, particularly in the South.

Aryabhata of Midnight Astronomy: The Ardharatrika system (Midnight astronomy) of Aryabhata was followed in India till Brahmagupta (628 CE) introduced Khanda-Khadyaka. Bhaskara describes it attributing to Aryabhata in his Bhasya (VII.21-35), but no work is available From the references available in other works, it is evident that Aryabhata would have written such a work. In the beginning of Khanda-Khadyaka Brahmagupta says, "***Vakshyami khanda-khadyakam acharyabhata tulyapalam***". As

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such remarks do not apply to the extent Aryabhatiyam, it is evident that he was referring to an extinct work of Aryabhata, which talked about Artharatrika system Varahamihira explicitly mentions in Pancha Siddhantika (20),

> ***"Lanka artharetra samye dhinpravrutim jagadh acharyabhataha***
> ***Bhuyaha: a iva suryodhaya atprabrutyaha Lankayam".***

The days begin from midnight (ardha-ratri) unlike Aydayika system, in which days begin from sunrise (udaya). As the computation of Latitude and yojana measure of Ardharatrika system have been unique, as noted by the commentators, it is evident that the system of Aryabhata is much earlier to Aryabhatiyam. As pointed out above, as the Aryabhata of Ardharatrika system gives much importance to Lanka and the four cities situated on niraksha, he must have been hailing from the South or Lanka itself for making such observations.

Precession of Ayanamsa: The act or rate of precession is called Ayana-calana and the amount of precession accumulated thereby is called Ayanamsa. Ayanamsa is the precession or a correction for the accumulated precession for the years calculated.

The Surya, Brahma, Soma and Vriddha Siddhantas, and later Siddhantas and Karanas give rules for Ayanamsa and make it clear that the ayanamsa was zero ie. Vernal equinox and the starting point of Mesha coincide with each other at the end of 3600 Kali or 499 CE. At the time of Aryabhata, Lalla, Varahamihira and Bhaskara, the Ayanamsa was zero, though it was not mentioned in their works.

Scholars quote that Lalla (c.500 CE) cites Aryabhata, when he says that "***Bhatodhita***" meaning as mentioned Bhata, while mentioning about the 24 Hsines. Though, Aryabhata is not specifically mentioned, Bhata is implied as Aryabhata. Could it be possible for Lalla to quote Aryabhata immediately within a year or was he quoting from the work of another Aryabhata existed earlier?

Munjala wrote Laghumanasa in 932 CE giving ayanamsa for 932 CE as 6^0 50'. This is presumably the amount of precession accumulated since Varahamihira prepared the corrected calendar around 500 CE. Therefore, this date tallies with the dates of others indicating that only ***the works attributed to the respective scholars were corrected and not that the works actually written by them***. Particularly, it is well known that no work of Aryabhata was available, but his quotations were copiously cited in their works.

John Bentley[16] fixed 61 CE, 292 CE and 532 CE as the commencement of the sixth, seventh and eighth astronomical periods for Hindu astronomy respectively[17]. L.D. Swamikkannu Pillai[18] fixed 536 CE as the year of Zero Ayanamsa and fixed the date of Varahamihira. This is in contrast to the Zero Ayanamsa found by the Indian astronomers as given below:

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Name of Astronomer	Saka year	Current Era	Seconds as the rate per year
Surya Siddhanta	421	499	54
Aryabhata	421	499	50
Varahaminira	427	505	47
Kalidasa	445	523	
Baskararacharya Suryadalvagna	412	490	60
Author of Ganakanandam	421	499	50
Bhaskara	528	600	50.5

Ayanamsa is taken as zero or nearly zero during the period 500-600 CE by the scholars and they try to fix the dates of important Indian astronomers in this period. This approximation is wrong, as even a second makes difference in astronomy chronologically. If this is the case, the dates of all works can be fixed at 499 CE when the ayanamsa was exactly zero. However, the important point is that the astronomical works were corrected by the predecessors or followers, according to the observations made by the astronomers of their periods.

Aryabhata, the First Imposter and Aryabhata, the Forger: John Bentley has been so allergetic about Indian astronomy and astronomers that he deals with them with utter contempt and disregard. His book. "A Historical View of the Hindu Astronomy" published in 1823 explains him. His main fear was that his religion would get affected, if the chronology of Hindus had been more ancient than that of Christianity, as he details. which need not be repeated here.

Bentley mentions about an Aryabhata as the First imposter[19], who places Rishis (Saptarishi mandala) to be in Magha in the year of Kali Yuga 600, so that the date, becomes 2501 BCE. Then he devotes one Section (III) to elaborate as to how Aryabhata of 1322 CE forged a work and circulated in the name of Parasara Samhita (pp.138-156). According to him, Varahamihira lived 200 years after Aryabhata ie, at 1522 CE during the period of Akbar to impose all forgeries of astronomy on him. He also suggests that Aryabhata would have got the knowledge from others[20].

Commenting on a passage given by Ganesa in his commentary on Surya Siddhanta, Bentley bursts out[21] –

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> "The object of this most absurd passage is, first, to give an appearance of immense antiquity to their astronomy, their history, and consequently themselves as a people; secondly, to throw back into antiquity of Aryabhata, Durga Sinha, Varaha Mihira, and others; which, however, is shown to be false in the very beginning of the book, where the author enumerates the astronomers whose works he consulted, in the order of their antiquity, thus: Brahma Gupta, Aryabhatta, Varaha, Lalla &c." (p.105-105).

The absurd passage, as characterised by him is as follows[22]:

> "The planets were right in the computed places in the time of Brahma Acharya, Vasistha, Casyapa, and others, by the rules they gave: but in the length of time they differed, after which, at the close of Satya age, the sun revealed to Meya a computation of their true places. The rules then received answered during the Treta, and Dwapar, as also did other rules formed by the Munis during these periods. In the beginning of the Kali Yuga Parasara's book answered; but Aryabhata, many years after, having examined the heavens, found some deviation, and Introduced a correction of bija. After him, when further deviations were observed. Durga. Sinha Mihira, and others, made corrections. After them came the son of Jistnu, and Brahma Gupta, and made corrections. After them, Kesava settled the places of the planets, and sixty years after Kesava, his son Ganesa made corrections."

As Kaliyuga forms basis of all astronomical calculations, he wanted to prove that the all planets aligned exactly at position 0^0 0' 0" is false and it was imposed by the Indian astronomers by forgeries. Therefore, it is very evident that he wants to oppose the antiquity of Aryabhata and his work by any means. Thus, his tirade against Aryabhata was so blatant and direct without any remorse. He uses the most derogatory and strong words in his attack, perhaps, it is called now as verbal terrorism.

Views Critically Analyzed: The views expressed by the western and Indian scholars, who have shown the external influence on Indian astronomy is quoted and discussed to find out the truth. John Bentley[23] pronounced:

> "***None of the Hindu artificial systems are ancient: they are all since A.D. 533, the year in which the modern astronomy commenced and at the beginning of the Kali Yuga, as imagined by Bailly or others; for they had no astronomy then.....their ancient astronomy... did not go further back then about 1425 before Christ, which was only the dawn of astronomy in India***".
>
> "...***the ancient Indian astronomy of the Hindus terminated in March A.D. 538, at which period the new system was introduced***."[24]

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His attempt had been religious oriented, he was more concerned and worried about upholding the biblical chronology. He even believed in the "Thomas myth in India. "His artificial and arbitrary division of Hindu history into four periods was totally incorrect. Even Surya Siddhanta and Aryabhatiyam prove that the so called modern astronomy had been in existence before such works.

P.C. Sengupta[25] opines:

> "***...from 100 to 400 A.D, we have a great gap of three hundred years in which astronomical knowledge from Babylon and Greece came to India. The oldest Surya Siddhanta was transmitted to this country during this period and its astronomy was most probably of a little more improved type than that of the Varaha Siddhanta of the Panca Siddhantika..***"[26]
>
> "***There is no doubt that Greek astronomy had come to India before the time of Aryabhata and Varaha has given us a summary in his Panca Siddhanta, of what was known by the name of the Romaka Siddhanta...***"

It is evident that even Indian scholars like him had also carried away by such western interpretation of Indian astronomical treatrises and historiography of Indian astronomy.

External Influence on Indian Astronomy: Starting with British colonial historiographers, the external influence not only on Indian astronomy, but also on almost all fields had been pointed out to prove that Indians had borrowed everything from other ancient civilizations or the west. Even David Pingree, who has surveyed the Indian astronomical literature, divides the history of Indian astronomy into five periods depending in most cases on the foreign origin:

1. Vedic…….. (1000-400 BC)
2 Babylonlan... ……..(c.400 BC-200 AD);
3. Greeco-Babylonian (c.200-400 AD):
4. Greek ……(400-1000 AD); and
5. Islamic…….. (c.1600-1800 AD)

And declares[27]:

> "……***..though the fundamental approach and many of the models and parameters of each period were determined by the foreign sources, the basic traditions of Indian astronomy imposed on these external systems its peculiar stamp, and transformed the Science of Mesopotamia, Greece, or Iran into something unique to India.***"

At the same time other scholars like Jean Sylvian Bailly, Erard Mollien, John Playfair and others pointed out that India had such concepts and only others borrowed. Bailly[28], the French astronomer, after verifying the Indian tables taken from Siam of 1667 CE, concludes that ***the Hindu systems of astronomy are by far the oldest, and that from them the Egyptians, Greeks, Romans, and even the Jews derived their***

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knowledge. Erard-Mollien[29] in 1853 showed that the zodiac of the Hindus was the most ancient datable to 3000 BCE, in which the roof and philosophy of all the most important religious festivals of that country were found and it differed from the Greeks. He thus, proved that ***the zodiacal figures were transmitted to the Greeks by the Chaldeans, who got from the Brahmans***.

Therefore, a question arises as to why, how, for what these western scholars present contradicting views or interpretations about the origin of Indian astronomy? What makes the difference if Indian borrowed from others or others borrowed from India? In spite of the prevailing two diagonally opposite views, why Indian scholars too stick to the borrowing theory borrowed-plumes theory?

Why Hindus Should Borrow From the Babylonians, Greeks and Others?: The above questions are linked with this question and so also the answers. For some reason the attitude western scholars has been to attempt to point out the Babylon, Greek, Roman and other outside influence on Indian arts and sciences. Even in the case of asterisms, though the Indian astronomy was initially based on asterism, attempts were made by Biot and Weber to prove that Hindus derived such system from the Chinese, but William D. Whitney[30] exposed them.

As pointed out above, the western scholars belonging to 19th century were giving credit to India, but that of 20th century accusing India for borrowing. Within a hundred years, just because there was change in stand of the scholars or historiography of astronomy, the facts cannot be changed or ignored. Incidentally, Indian source materials are openly available for verification and study. They have not been subjected to editing. expurgation or expunction, whereas the Greek Roman and other sources haave been edited, expurged and expunged.

It may be noted that the extraneous, round about alleged Influence on Aryabhata and Aryabhatiyam is only and not direct, that too, based on assumptions and presumptions. Firstly, they impose a precondition that Indian astronomy could start only during a particular period and wait for the Alexander invasion to have the Greek invasion in 326 BCE. Wherever, they could not discover any Greek like influence, they allege about Roman, Babylonian and so on. Thus, the hypothesis is carried on converting into theory and theory into established fact. Therefore, such a blased, prejudiced and predetermined research methodology cannot be accepted and Indian scholars should re-research into the facts to find out the truth.

As the work Aryabhatiyam itself is a compiled one and the original work had been lost, with the available work, the discussion about alleged influence cannot have any conclusion to decide about. As discussed above, it is evident that Aryabhata belonged to South India and he followed traditional astronomy adapting and adopting the changing trends in astronomical observations. Therefore, external Influence cannot be attributed to his work.

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